

The Planters' Chronicle.

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THE U. P. A. S. I.

(INCORPORATED.)

Contents.

The Scientific Department of the U. P. A. S. I. publishes an article on the value of Neem Poonac, Husk and Neem Poonac, giving a table of their respective values, which conclusively proves the almost uselessness of the former as a fertilizer. Those who purchase the former, after reading this valuable paper, will be buying an article hardly worth the cart-hire. Included in this article is another note of warning about Green Bug which has appeared in places so widely separated as South Mysore and South Coorg.

From Mr. Clarke comes an interesting letter pointing out the concession made by the Traffic Manager, S. I. Ry. and the advantage of shipping tea direct from Madras. The facility of shipping from Madras, now that boats can come up to the wharf, by which the risk of damaged tea is obviated, is remarked on.

Rubber Planters will be interested in the two articles on Tapping Experiments in Kuala Lumpur by F. G. Spring who recommends the V shaped method of tapping as yielding a superior out-turn to others, and gives a return in tabular form of the 2nd year's results on six plots.

The second article is by Mr. R. H. Lock on "The Intervals of Rubber Tapping." After many experiments he arrives at the conclusion that an increased rubber yield is arrived at by longer intervals of tapping. There are so many ways of tapping in favour and in force, that only by experiment and by publication will a universal means be adopted, adding to the life of the tree, its speedier renewal of bark, and increased yield.

At a time when the Scientific Officer is impressing on Coffee planters to provide themselves with sprayers, the publication of an article on experiments made with sprayers at Wisley before experts, comes most appropriately.

THE SCIENTIFIC DEPARTMENT, U.P.A.S.I.

Neem Husk.—It appears that in some districts when Neem Poonac is procured from village crushing mills the native vendors insist upon the Husk being bought also in the proportion of three of poonac to two of husk. The poonac costs Rs.45 per ton and the husk Rs.10 per ton, exclusive of freight. The question arises as to the manurial value of this husk, and a sample analysed in my laboratory gave the figures in the first column of the table below. The figures in the second column are those given by Mr. Harrison, the Government Chemist, in Vol. III, Bulletin 65 of the Madras Department of Agriculture, as being typical of a good neem poonac.

	Neem Husk.	Neem Poonac.
Moisture	6'57	10'30
Organic Matter	79'77	...
Nitrogen	0'28	5'04
Soluble Ash	4'94	5'82
Insoluble Ash	8'72	3'19
Phosphoric Acid	0'19	1'31
Potash	0'75	1'69

A glance at these figures will show that the husk is quite useless as a fertilising material. Leaving out of the question the fact that from the nature of the material it probably takes much longer to rot down and become available than the poonac, if its value is calculated on the basis of its Nitrogen content as compared with Poonac at Rs.45 per ton it is seen to be worth only Rs.2'8 per ton while Rs.10 is being asked for it. We may conclude from these figures that this material is not worth cartage to the estate especially when this costs Rs.7'8 per ton as it does in the particular case in question.

Green Bug.—The Green Bug is still giving a certain amount of trouble in Mysore, and another estate in the neighbourhood of Saklasapur reports its presence. It has also appeared unfortunately in one small area in Coorg. It is very obvious that this pest has got to be faced in the immediate future and planters must do everything in their power to be ready to tackle it seriously and to combine against it. On 20th May a combined meeting of the three Mysore Planters' Associations in which the Native Planters' Association are joining is to be held at Chickmagalur to discuss what steps are to be taken to prevent the spread of the pest. Probably the Mysore Agricultural Department will also be represented at this meeting and the Deputy Commissioner, Kadur district, has been invited to be present. The Assistant Scientific Officer for Mysore will lecture at this meeting on the "Green Bug" and its life history and explain the views of the Scientific Department of the U. P. A. S. I. as to how it may be controlled. It is to be hoped that the meeting will be well attended by planters and that some practical scheme will be evolved and carried out after it has been agreed upon. In any policy of control one man who will not carry out the measures which are recommended and agreed upon by the rest may destroy the whole attempts of the planting community to eradicate the pest.

It is very important to discover if possible how the scale has been introduced so that measures may be taken to check its further entrance. Personally I believe it will be found on the jungle trees in the neighbourhood of the infected areas and these should be carefully searched for its presence. In this work the assistance of the planters is urgently needed.

R. D. A.

CORRESPONDENCE

THE EDITOR,

Planters' Chronicle,

Bangalore.

Dear Sir,—I am always interested in the various papers by Mr. Anstead and others appearing in your paper but personally speaking as a beginner, I should be grateful to see more papers on one's ordinary everyday work. In my own case this would be anything in connection with tea—papers on tea manufacture, building, labour management, wire shoots, liquid fuel, factory, machinery, estate accounts, etc., would interest me personally very much and I daresay I should not be the only one.

Hoping you may be able to consider my suggestion.

Yours faithfully,

"X."

9th May, 1913.

"Rob Roy," Kotagiri,

Nilgiris, May 9th, 1913.

THE EDITOR,

Planters' Chronicle.

Dear Sir,—The following information may be of use to Tea planters situated near the S. I. Ry. in the Nilgiri District, or Anamalais, &c.

I have been in correspondence with the General Traffic Manager, S. I. Ry. regarding a concession for sending Tea from Mettappallium to Madras direct, as up to now there is none and the freight for a F/C of 120 lbs. gross is Re.1 4/9 and H. C. of 80 lbs. is 13 annas 9 pies

The freight from Mettappallium to Calicut is 10 annas a F/C of 120 lbs, as there is a concession and the rates are as follows:—

11 annas 1 pie per F/C and 5 annas 8 pies per H. C.

From the above figures you will see that it will only cost me 4 pies more per F/C to send it from Mettappallium to Calicut and then back from Calicut to Madras, than to send it direct from Mettappallium to Madras harbour. I pointed this out to the G. Traffic Manager of the S. I. Ry. and he has kindly replied as follows:—

I. From May 10th, 1913 Tea in chests or cases in any quantity at owners' risk from Mettappallium to Madras harbour via Jalarpet will be rated at 10 annas 8 pies per maund.

II. This rate is inclusive of the harbour charge of 2 pies per maund, and the combined rule does not apply.

III. Tea from Mettappallium to Tuticorin will be rated at 11 annas 7 pies per maund.

The above rates work out at Re. 1 per F/C of 120 lbs. gross against Rs.1-4-9 previously, and 10 annas 8 pies against 13 annas 9 pies previously, so this is a very appreciable concession for the Railway to have made us, and I trust that as many planters as possible will take advantage of it.

Then as regards Freight ~~Homes~~ from Madras compared to that from Calicut, the following facts are worth noting :

Messrs. Parry & Co., write as follows :

Freight on Tea chests to London is : 30s. per ton of 50 c. ft.

The duration of voyage is about 31 days.

A Rebate of 10 per cent. on freight is allowed to shippers 6 months after shipment by the following Lines :

R. I. S. N. Co., Clan Line, City Line, and Hall Line, provided shipment is confined to them.

Freight.—Calicut to London by Coaster is 46s. 3d. per ton of 50 c. ft. or by direct clan boat 30s. per ton of 50 c. ft. *but no rebate is allowed.*

Then again one can't ship from Calicut from June to Sept, on account of the monsoon and of course putting the tea on board at Madras is far cheaper than at Calicut and far less risky as the boats now come alongside the wharf at Madras.

Altogether I think the above facts will show that we shall all be far wiser to ship our Teas from Madras in future.

Please publish in the *Chronicle* if you think this is likely to interest the tea planting community.

Yours faithfully,

(Signed) ERNEST S. CLARKE.

"Ceylon Labour Commission; Madras Eyes."—Mr. H. Scoble Nicholson's report of the operations of the Ceylon Labour Commission in India for 1912 is an unusually informing document, and throws some remarkable side lights on the question of emigration to Ceylon and other planting centres, says the *Madras Times*. In the absence of other assistance, it adds, we must take it that the Ceylon Labour Commission is doing a beneficent work in finding occupation and wages for a people who drag on existence on one poor meal a day! It strikes us as remarkable, also, that the landowners of the Presidency who complain of the drain of labour should not adopt measures to provide themselves with labour from districts where the conditions of life are so hard. It should not be difficult to effect a remedial movement of population in the Presidency Districts. It is quite clear that coolies go to Ceylon and the Straits Settlements only when they are in pecuniary difficulties and when famine conditions prevail, and the non-official members of the Legislative Council and the leading men in the districts, could, the Madras paper is sure, improve matters. It is also surprising that the various Planters' Associations in South India should not have discovered this state of things and done something to remedy this waste of labour which Ceylon Labour Commission now hopes to utilise. We have been disposed to believe that the drain of emigration was doing the agricultural industry in the Presidency infinite harm, but a perusal of the Report under notice has somewhat disturbed that conviction. It seems to us that if emigration is doing the harm to agriculture it is asserted to be doing, there would not be such dearth of employment, and such miserable wages as obtained in Cuddapah, Guntoor, and Nellore. The obvious remedy for local landlords and planters is in the direction of better wages and better conditions all round for their coolies.—*The Ceylon Observer*.

TAPPING EXPERIMENTS.**Preliminary Notes on Tapping Experiments at Kuala Lumpur.****SECOND YEAR RESULT—BY F. G. SPRING.**

The results of the first year's working of this experiment were published in September 1912, Vol. 1, No. 2 of the *Agricultural Bulletin*, Federated Malay States. It may be remembered that the experiment is divided into six different systems of tapping which are as follows.

PLOT 1.

System of Tapping—Quarter (Half Herring bone).

Two cuts 18 inches apart, twenty cuts to the inch.

Every day Tapping.

PLOT 2.

System of Tapping—Adjacent Quarters, Full Herring bone.

Two cuts 18 inches apart on each quarter.

Twenty cuts to the inch.

Alternate day Tapping.

PLOT 3.

System of Tapping—Singles, V, 36 inches from base of tree.

Twenty cuts to the inch.

Every day Tapping.

PLOT 4.

System of Tapping—Double V, cuts 18 inches apart.

Twenty cuts to the inch.

Alternate day Tapping.

PLOT 5.

System of Tapping—Opposite Quarters. One cut of 36 inch on each quarter.

Twenty cuts to the inch.

Alternate day Tapping.

In each plot tapping areas are so marked out that the circumference of tree should be completely tapped in 4 years, thus allowing 4 years for bark each renewal.

The number of trees in each plot is 65. Distance of planting 16 x 16 feet.

The average girths measures 3 feet from the round in plot 1, 2, 3, 4, 5, and 6 at the beginning of the experiment were as follows: 20½, 20½, 21, 21 1½, 21 3½ and 21½ inches.

Before considering the results of the second year it would be as well to give the amounts of Latex Rubber, Scrap, Bark Shavings and total rubber obtained during the first year of tapping. These figures are as follows:—

	Plot 1.		Plot 2.		Plot 3.		Plot 4.		Plot 5.		Plot 6.	
	lbs.	oz.	lbs.	oz.	lbs.	oz.	lbs.	oz.	lbs.	oz.	lbs.	oz.
Latex Rubber	125	2½	99	12	93	13½	95	13	90	6	74	6½
Scrap	20	9½	13	12½	20	0	12	6½	22	11	16	14½
Bark Shavings	11	13½	12	3½	12	4½	12	15	15	15½	15	11
Total Rubber	157	9½	125	12	126	2	121	2½	129	0½	107	0

In plots 1, 3 and 5, in which the trees were tapped every day, the results for the first year were not perhaps strictly comparable because whereas in plot 1, the tapping cuts had extended at the end of the year's experiment to the base of the tree, in 3 and 5, the upper 18 inches only had been tapped, consequently in the two latter cases there remained an untapped area of bark at the base of the trees, which according to what is generally supposed give a bigger yield of latex than any other part of the trunk. It would be expected, therefore, that in the second year of tapping the V would have an advantage over the single quarter system as the cuts forming it are 18 inches from the ground at the commencement of the second year while in the case of the single quarter there are two superimposed cuts of 18 inches. The results clearly show this. During the first year the single quarter gave more total rubber than the V but the second year the V is far superior. Taking the period of the two years there is an excess of 48 lbs. total rubber in favour of the V and, considering that the number of trees in each plot is only 65 the difference is a considerable one. In both plots (1 and 3) tapping is conducted every day so that the excess of 48 lbs. must be due to the system.

Another series of experiments being conducted at Kuala Lumpur, which will be published later, the V is also found to be superior to single or opposite quarters.

It is satisfactory that the results of a number of different series of experiments all point in the same direction. There may remain a doubt with regard to whether the V or half herring bone gives the largest yield of total rubber over a number of years but the writer is of opinion that the V will be proved, in the end, to be the best system. There is little doubt that opposite quarters gives far less rubber than either of the other two systems.

Comparing plots 3 and 4 where the V is adopted in both cases. In number 3 there is one V tapped every day while plot 4 there are two Vs tapped alternate days. Over the period of two years the every day tapping gives an excess of 63 lbs. more total rubber than alternate, which works out at 63 lbs. per acre per annum calculating 130 trees to the acre. In the case of old rubber a larger difference would, in all probability, be found in favour of every day tapping. It has already been found that doubling the number of cuts and converting every day tapping into alternate days does not pay and it would appear also from the present experiment that less rubber is obtained from alternate day tapping where an equal amount of bark is removed in any time.

Judging from results at present being obtained, opening up young trees with a basal V has much to recommend it especially if this is continued the 2nd year by a basal V on the other side of the tree, and the 3rd year by a top V above the first basal V and the fourth year a top V opposite the V of the 3rd year. By adopting this method the V system of tapping is retained throughout.

Opposite quarters require little consideration as there is nothing to recommend it. It will be seen by referring to the tables that the amount of total rubber is considerably lower than that obtained from the V or single quarter. That the V is superior to opposite quarters is further supported by results obtained at Gunung Angai Experimental Plantation, an account of which was published in Vol. I No. 4 of the *Agricultural Bulletin* Federated Malay States.

Second Year Result.

		Plot 1.		Plot 2.		Plot 3.	
		Latex	Scrap.	Latex	Scrap.	Latex	Scrap.
		lbs.	oz.	lbs.	oz.	lbs.	oz.
February	1912...	12	1	10	8 9½	1 2½	34 7½
March	" ...	10	11½	2 1	8 11	0 14½	14 2 1 12½
April	" ...	10	15	1 7½	10 9	1 0 15	4 1 11
May	" ...	13	12	1 11½	13 9	1 7½	20 13½ 1 14½
June	" ...	13	7	1 14	13 4	1 1 20	3½ 1 9
July	" ...	17	7	1 10	17 14½	1 1 25	0 1 8
August	" ...	16	2	1 11	23 9½	1 3 26	6½ 1 8
September	" ...	16	12½	2 3	22 13½	1 7 26	1 2 7
October	" ...	19	3½	1 13	22 8	1 3 24	13 1 11
November	" ...	17	5	1 10	22 8½	1 3 25	10 1 2½
December	" ...	18	4	1 9	24 2½	1 1½	77 10 1 3½
January	1913	16	9½	1 5	19 2	0 15	22 6 1 6
Total...		182	10	20	9 207	5 13	11 262 13 19 8

Bark Shavings	...	11	10	...	15	7	...	11	1	...
Scrap	...	20	9	...	13	11	...	19	8	...

Total Rubber... 214 13 ... 237 7 ... 294 6 ...

		Plot 4.		Plot 5.		Plot 6.	
		Latex	Scrap.	Latex	Scrap.	Latex	Scrap.
		lbs.	oz.	lbs.	oz.	lbs.	oz.
February	1912...	9	3	0 12	11 1	1 14	5 14½
March	" ...	10	3	1 1	9 12	1 14	7 1 1 3
April	" ...	10	11½	0 15½	8 6	1 8	8 12 1 1½
May	" ...	13	14	0 15	8 4½	1 10½	11 3½ 1 6
June	" ...	14	2	1 5	12 1	1 7½	12 1½ 1 2½
July	" ...	18	11	1 1	17 6½	1 8 13	3 1 11
August	" ...	24	10½	1 2	13 9	1 10	12 4 1 5
September	" ...	24	6	1 6	11 3	2 3 9	2½ 1 4
October	" ...	24	30½	0 2	10 11½	1 9 11	13 1 6½
November	" ...	20	7	0 14	13 8½	1 8½	19 12½ 1 10
December	" ...	21	8	0 13	21 13	1 6 15	13 1 6½
January	1913...	20	9½	0 10½	21 12	1 6½	12 7½ 1 4
Total...		213	6	12	1 159	8 19	9 130 13 15 5

Bark Shavings	...	11	8	...	12	4	...	12	10	...
Scrap	...	12	1	...	19	9	...	15	5	...

Total Rubber... 236 9 ... 191 5 ... 158 12 ...

— "The Agricultural Bulletin" of the Federated Malay States.

RUBBER.

Intervals in Rubber Tapping.

We take over from the *Rubber World* (London) the following able contribution from the pen of Dr. R. H. Lock.

The majority of planters will probably agree that the ideal system of tapping rubber trees has not yet been devised. Even the question of paring *versus* pricking cannot yet be regarded as absolutely settled. At least two promising methods of incision or pricking are at the present moment under trial in Ceylon. The method of paring is, however, practically universal in estate practice, and it is with the paring method alone that we are concerned in the brief remarks which follow.

It is well-known that Fitting has laid great stress on the importance of limiting the amount of the circumference which is subject to tapping at any given period. Many practical people think that this writer has exaggerated the harmful effect of paring cuts which extend half-way round the tree or more. Nevertheless, there can be no doubt that Fitting is quite sound in theory. At the present time, in fact, there is probably a consensus of opinion among experts that tapping at any particular period should not extend beyond a quarter section of the tree, and that four years at least should be allowed for the renewal of the bark.

Mr. Herbert Wright, who is perhaps unique among those who control the fortunes of rubber companies in possessing the equipment of a thorough scientific training both in botany and in tropical agriculture, has preached for a good many years the gospel of conservation of the bark. The method of saving bark upon which Mr. Wright has laid the greatest stress is that of reducing the length and increasing the distance between the tapping cuts as much as is compatible with a full yield of latex. Whilst cordially endorsing the doctrine of bark-conservation, our present object is to discuss another method of bark-saving, namely, by increasing the interval between successive tapings.

The general practice on estates at present is to tap either daily or on alternate days. If the system of tapping single quarter-sections be adopted, the distance between the original cuts will be mainly determined by the rate at which the bark is used up, and this again depends upon the thickness of the parings removed by the tapper. This, if there are only 15 cuts to the inch, or 180 to the foot, one foot of bark will last a year if tapped on alternate days. For daily tapping on the same area, the original cuts must be marked out two feet apart. On the other hand, some estates report as many as 30 cuts to the inch. Where this degree of perfection is attainable, one foot of bark will last a year with daily tapping. In the majority of cases some intermediate distance will be required. With alternate day tapping, it is therefore clear that there should be no difficulty in deferring the tapping of renewed bark for four or even six years—a period which would probably satisfy the most exacting of botanical specialists.

The value of the policy of limiting the quantity of bark excised at each tapping, great as it is in theory, has yet a practical limit. In addition to the effect of tapping upon the tree, the question of economy of labour has also to be considered. If the yield of latex were simply proportional to the length of the paring cuts, and if there were no need to consider the effect of tapping upon the tree and its future yield, the heavy tapping still in vogue on some estates would be fully justified on account of the economy of labour,

When the coolie has once started tapping a tree, the rapid appearance of the latex at once concentrates his attention on the work in hand. The tree finished, the coolie finds it necessary to stretch himself, to gather up his chattels in a leisurely fashion and so proceed to the next. It is between the trees that the time is chiefly wasted. Hence the total length of paring performed by one coolie in a day is greater when a few trees are heavily tapped than when a larger number is tapped more lightly. By increasing the interval between successive tapplings, the tapping of renewed bark can be delayed for any desired period, whilst ensuring a reasonable task for the tapper on each tree.

This point would be of little importance of itself, were it not for the evidence which exists of increased yields of rubber per tapping when the intervals between tapplings are increased. Careful and prolonged experiments on the effect of different intervals have been carried out in Ceylon under the direction of Dr. Willis, the former Director of Botanic Gardens, recently transferred to Rio de Janeiro, to Ceylon's loss and Brazil's gain. The experiments were carried out on old trees closely planted, and it is only to such conditions that they can be said at present to apply. The intervals between successive tapplings on similar groups of trees varied from one to seven days and upwards. During the early stages of the experiment the total annual yield was greatest from trees tapped at the shortest intervals, and the highest yield per tapping was greatest from trees tapped once in three or four days. As time went on, the yield per tapping from the trees tapped at longer intervals steadily increased, until the annual yield from trees tapped once a week became as great as that from trees tapped at any shorter interval. It should be stated that by this time the trees tapped at intervals of one and two days had to be rested, owing to the imperfect renewal of the bark.

This result has been confirmed on a commercial scale. On a well-known estate in Ceylon, a field of old trees, closely planted, had been somewhat severely tapped at three-day intervals. The interval was increased to one of six days with little falling off in yield, whilst the labour bill was of course reduced by one-half.

We believe that the effect which has been described is due to the long continued influence of what is known as wound-response. Hitherto this expression has generally been employed in connection with the increase in yield often observed during the first few tapplings of a virgin tree. It would appear that long continued tapping leads to a more permanent form of response to what may be described as the acquirement of a habit of increased latex production on the part of the tree. The latex obtained by tapping at longer intervals contained a somewhat higher percentage of rubber than that yielded by the more frequently tapped trees, but this does not by any means account for the whole effect. The yield of latex was also materially higher in the former.

How far the principle applies to younger trees planted at wider intervals remains to be determined. But it is clear that the method is worthy of trial on a wide scale under various conditions. Such trial, however, demands very prolonged and careful attention. It is obviously futile to attempt to check the result of an experiment, carried out continuously over a period of four years, by tapping a few trees for three or four months. Nevertheless, the result of a single unconfirmed experiment can never be regarded as anything more than suggestive, and full experimental confirmation is eminently desirable.—*Grenier's Rubber News.*

SELECTED CUTTING.

Spraying Trials at Wisley.

A trial of spraying machines was held at the Royal Horticultural Society's Gardens, Wisley, on April 23. Fine weather favoured the event, but did not tempt more than about a score of visitors to put in an appearance. The judges were Professor Maxwell Lefroy, Messrs. E. S. Salmon, F. J. Chittenden, Cecil H. Hooper, Henry Hooper, C. R. Fielder, and S. T. Wright. The work was done very thoroughly, the judges looking closely into the inner mechanism of the machines as well as seeing them put to the practical test.

The points to which the judges directed particular attention were: (1) The suitability of the machines for use with various washes; (2) general construction, including simplicity and accessibility of parts, ease of working and repair, replacement of parts, facilities for cleaning, durability, etc.; (3) the efficiency of the nozzles, and (4) the cost of the machines and accessories. The various machines were tried with lime wash, containing about as much lime as would be included in ordinary Bordeaux mixture. The efficiency of the nozzles was tested by directing the spray on to sheets of brown paper fixed to a temporary fence, as well as by casting it into the air. The only important point that could not be tested was the movability of wheeled machines on the rough ground of a fruit plantation, the trials being conducted in a smooth gravelled yard. In no case was the nozzle clogged, although the lime wash was supplied unstrained, and the competitors were required to pass a considerable quantity of it through their machines.

SYRINGES.

Messrs. G. and W. Purser, Ltd., 92, Hatton Garden, London, showed the Arnold syringe. The feature of this implement is that the nozzle requires no bend or elbow, the spray being directed either straight ahead or at an angle by simply turning the syringe in the hand. It has really two nozzles in one. When the bent nozzle is turned down the spray goes through the straight one; but on the position being reversed, a ball falls automatically and prevents the spray from going straight, so that it finds its way out through the bent nozzle. The idea is ingenious, but the arrangement did not seem to work quite smoothly in practice. Apart from this, the spray produced was satisfactory.

The syringe entered by the Four Oaks Spraying Machine Co., Sutton Coldfield, is notable chiefly for the corrugated outer cover of its barrel, which is claimed to be undentable. Two grades of nozzles are supplied in addition to a straight jet or a rose may be had instead of one nozzle. A good spray was produced.

The Abol syringe, shown by Messrs. E. A. White, Ltd., Paddock Wood, Kent, is very efficient, well made, and fitted with a drip-preventer. The nozzle produces a particularly good spray.

Messrs. Wm. Cooper and Nephews, Berkhamsted, sent one of their Protector syringes, the distinguishing feature of which is that the nozzle has a gauze strainer at the end.

KNAPSACK SPRAYERS.

For the majority of fruit-growers some form of knapsack sprayer is the most convenient type of machine. These are of two kinds: (1) those that maintain a continuous spray by means of compressed air, and (2) those that have to be pumped all the time whilst on the back. The advantages of the former class are soon appreciated by those who have to do a day's work

with them. Sufficient pressure of air is pumped into the machine after it is charged with wash to expel all the liquid without further pumping, so that the operator has only to direct the spray when he gets the machine on his back. Two sprayers of this type were entered. The Holder sprayer, shown by Messrs. Hartjen and Co., 35, Noble Street, E. C., was of very sound construction. All seams are well riveted as well as brazed, and the metal is a brass alloy which does not corrode under the influence of the now popular lime-sulphur and potassium sulphide washes, facts which are important from the point of view of safety when considerable pressure has to be put into a machine. The cylinder is charged three parts full of wash (about 3½ gallons), and air is then pumped in until the gauge shows 75 to 80 lb. pressure. This is done on the ground by means of a piston which is part of the machine. The pressure thus given is enough to spray out the whole of the liquid contents. The cylinder is slung on the back in an upright position.

The Alpha Knapsack sprayer, entered by Messrs. Robinson Bros., Ltd., Ryders Green, West Bromwich, works in a similar way to the last, but the air pressure is produced by means of an ordinary bicycle foot pump, which is detached after the machine has been charged.

The older type of knapsack sprayer, which has to be pumped all the time, was shown by Messrs. E. A. White, Ltd. (Abol), Four Oaks Machine Co., Cooper, Pegler and Co., Ltd. (Vernorel), and Benton and Stone, Birmingham (Enot's). The sprayers of all these firms seem to do equally good work, but the over-shoulder action of the Four Oaks machine is certainly no improvement, as it is awkward, and shifts the machine on the back too much.

LARGER MACHINES.

Wheeled machines, with powerful pumps, become necessary where there are tall standard trees to spray. A good impression was made by Enot's Utility machine, shown by Messrs. Benton and Stone, Birmingham. This is in the form of an oblong, galvanised, 40-gallon tank, mounted on two large iron wheels for moving wheel barrow fashion. The strong feature is a very powerful and easily working pump, and the weak point is a somewhat inefficient agitator. The action of the pump causes two brushes to move against the gauze strainer and keep it clear, which is useful with a lime wash; but the brushes would be better removed when using a caustic wash, which would quickly wear them away. The machine was shown working two nozzles mounted on 6 foot lances. There are ingenious arrangements for clearing the nozzles should they become blocked.

The Four Oaks Bottle machine has an oval oak 18 gallon barrel mounted on two large wheels for moving in wheel barrow style. The pump is double-acting and easily removed for cleansing. Two 15 feet lengths of armoured hose are supplied, with nozzles on long lances, and there is a good agitator. The machine altogether is handy and workmanlike.

The Alpha machine differs from the preceding in being pneumatic. It consists of a cylinder to hold the charge of wash and compressed air, and a large supply-tank, mounted on a trolley, with four wheels, to be drawn by a pony. The cylinder is charged two thirds full of wash, and air is then forced in as in knapsack sprayers. But here there is a screw-rotary pump, which is worked at intervals to keep the cylinder filled with wash from the supply tank, and the entrance of this wash into the cylinder at the same time maintains the air pressure. Thus the machine has to be charged with air only once for a day's spraying.

Messrs. Hartjen showed an adaptation of the knapsack sprayer in their Battery System. This is a device for charging a set of knapsack sprayers with both air and wash, the latter being contained in a large supply tub or tank placed on the ground in any handy position. The cylinder is set on a stand and charged with about 30 lb. pressure of air first. Then the wash is pumped in, which increases the pressure to 100 lb. or 120 lb. The original pressure remains in the machine, being kept there by its own pressure on a floating ball, which falls as the wash is exhausted. Thus one charge of air lasts for a whole day's work. The knapsacks are brought back to the tub from time to time to be refilled with wash.

SMALL HAND SPRAYERS.

Small pneumatic hand sprayers, holding about 4 pints, are very useful under glass or in small gardens, or for freshening up exhibits at shows. Such machines of very similar type were shown by Messrs. Hortjen, Cooper, Pegler and Co. (Vermorel), Robinson Bros. (Alpha), and Benton and Stone (Enot's). The first two have the advantage of an automatic stop-cock, the spray being turned on by simply pressing with the finger, and stopped by its release. The Enot machine has a safety valve to prevent overcharging. The Alpha is charged with a cycle pump, which reduces the cost.

BUCKET SPRAYERS.

The Arnold bucket sprayer, with galvanised bucket and brass pump, was shown by Messrs. G. and W. Burser. The pump is double-acting and throws a good spray, the piston being worked up and down with one hand, whilst the other directs the nozzle. The nozzles are similar to those in the Arnold syringe.

The Boundary Chemical Co., Cranmer Street, Liverpool, showed a pump to fit any bucket. This was sent with only one nozzle, but it provided an excellent spray.

The awards recommended by the judges will not be made public until they have been approved by the Council of the Society on Tuesday next.—*The Gardener's Chronicle.*

TEA IN 1912.

SCIENTIFIC MANURING PROVES ITS VALUE IN CEYLON.

One of the most interesting annual reports for 1912 is the one issued by Messrs. McMeekin and Co., on the World's Tea Market during last year. In this report questions affecting both production and consumption are exhaustively discussed in a way that shows an intimate knowledge of the trade. We quote the following:—

"For most of the interests dependent on the tea trade, 1910 may be held to have been a better year than 1912. The growers in every one of the great countries of production, taken in the aggregate, have had a record year for quantity, but in many cases the larger yield has been produced at the expense of quality and consequently of price. In India the average rate of yield per acre showed in 1912 a considerable increase, the figures being 504 lb. as against 466 lb. in 1910. The Assam district was responsible for the major portion of the increased crop in India (274,250,000 lb. for 1912 crop v. 269,000,000 lb. in 1910, or 5,250,000 lb. more). In Ceylon the effect of rubber growth is obviously telling upon many low countries estates, which were entirely interplanted with the new product, and some of these must soon disappear from the producing list. On the other hand, scientific manurial cultivation does not seem to have reached the limits of its results, and extensive new separate plantings in tea are rapidly approaching the stage of growing crops."—*Tropical Life.*